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THE Be-Tc (BERYLLIUM-TECHNETIUM) SYSTEM

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Equilibrium Diagram

[67Buc] reported that the superconducting transition temperature of Be₂₂Tc is 5.21 K. No other compounds have been found to date.

The melting point of β Be and the β Be \rightarrow α Be allotropic transformation temperature are 1289 \pm 4 and 1270 \pm 6 °C, respectively [85BAP]. The melting point of Tc is 2204 \pm 50 °C [81BAP].

Crystal Structures

A summary of crystal structure and lattice parameter data is given in Table 1. The crystal structure of Be₂₂Tc is assumed to be the same as that of Be₂₂Re [85Okal].

[80Tan] predicted the possible existence of a stable or metastable compound, BeTc, having CsCl-type crystal structure from the study of a series of alloys based on Be.

Cited References

- 67Buc: E. Bucher and C. Palmy, "Superconductivity and Isotope Effect in Be₂₂X Compounds and Molybdenum," Phys. Lett., **24A**(7), 340-341 (1967). (Equi Diagram; Experimental)
- 80Tan: L.E. Tanner, "The Stable and Metastable Phase Relations in the Hf-Be Alloy System," Acta Metall., **28**(12), 1805-1816 (1980). (Crys Structure; Theory)
- 81BAP: "Melting Points of the Elements", Bull. Alloy Phase Diagrams, **2**(1), 145-146 (1981). (Equi Diagram; Compilation)
- 81Kin: H.W. King, "Crystal Structures of the Elements at 25 °C", Bull. Alloy Phase Diagrams, **2**(3), 401-402 (1981). (Crys Structure; Compilation)
- 82Kin: H.W. King, "Temperature-Dependent Allotropic Structures of the Elements", Bull. Alloy Phase Diagrams, **3**(2), 275-276 (1982). (Crys Structure; Compilation)
- 85BAP: to be published in Bull. Alloy Phase Diagrams (1985). (Equi Diagram; Compilation)

850ka: H. Okamoto and L.E. Tanner, "The Be-Re (Beryllium-Rhenium) System," to be published in Bull. Alloy Phase Diagrams (1985).
(Equi Diagram; Review)

Table 1 Be-Tc Crystal Structure and Lattice Parameter Data

| Phase | Composition, at.% Tc | Struktur- Pearson bericht | | Space group | Proto- type | Lattice parameters, nm | | Reference |
|------------------------|-------------------------|------------------------------|-------------|----------------------|---------------------|------------------------|---------|-----------|
| | | symbol | designation | | | a | c | |
| (β Be).... | 0 | cI2 | A2 | Im3m | W | 0.25515 | ... | [82Kin] |
| (α Be).... | 0 | hP2 | A3 | P6 ₃ /mmc | Mg | 0.22857 | 0.35839 | [81Kin] |
| Be ₂₂ Tc... | 4.3 | cF184 | ... | Fd3m | Zn ₂₂ Zr | ? | ... | (a) |
| (Tc)..... | 100 | hP2 | A3 | P6 ₃ /mmc | Mg | 0.2738 | 0.4394 | [81Kin] |

(a) Analogy to Be₂₂Re is assumed.

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